Title (en)

TURBINE AIRFOIL WITH PASSIVE MORPHING STRUCTURE

Title (de)

TURBINENSCHAUFEL MIT PASSIVER MORPHING-STRUKTUR

Title (fr)

PROFIL AÉRODYNAMIQUE DE TURBINE AYANT UNE STRUCTURE DE MORPHAGE PASSIVE

Publication

EP 3173582 B1 20220420 (EN)

Application

EP 16200203 A 20161123

Priority

US 201514950343 A 20151124

Abstract (en)

[origin: EP3173582A1] A turbine engine airfoil apparatus, comprising an airfoil (18) defined by a plurality of airfoil sections (36,40,136) arrayed along a stacking axis (34) that extends between a root (20) and a tip (22), wherein at least two of the airfoil sections (36,40,136) spaced apart from each other have differing airfoil section thermal expansion properties. A first section (136) may include a plurality of regions (146,148,150), wherein each of the regions has its particular coefficient of thermal expansivity. Thus, the airfoil (18) may have a static shape at standard atmospheric temperature and a second morphed shape at elevated temperature levels. The airfoil (18) has accordingly a variable camber depending on the fluid temperature. The airfoil is manufactured using an additive manufacturing method such as selevtive laser sintering or direct metal laser melting and the airfoil may be made of a metallic alloy or ceramic powder.

IPC 8 full level

F01D 5/14 (2006.01); **B22F 3/105** (2006.01); **B22F 5/04** (2006.01); **B22F 7/06** (2006.01); **F04D 29/02** (2006.01); **F04D 29/32** (2006.01); **F04D 29/54** (2006.01); F01D 5/28 (2006.01)

CPC (source: CN EP US)

B22F 5/04 (2013.01 - EP US); **B22F 7/06** (2013.01 - EP US); **B33Y 10/00** (2014.12 - EP US); **B33Y 80/00** (2014.12 - EP US); **F01D 5/147** (2013.01 - US); **F01D 5/148** (2013.01 - EP US); **F01D 5/28** (2013.01 - CN EP US); **F01D 9/041** (2013.01 - US); **F01D 11/18** (2013.01 - US); **F04D 29/023** (2013.01 - EP US); **F04D 29/321** (2013.01 - EP); **F04D 29/324** (2013.01 - EP); **F04D 29/541** (2013.01 - EP); **F04D 29/542** (2013.01 - EP); B22F 10/25 (2021.01 - CN EP US); B22F 10/28 (2021.01 - CN EP US); B22F 10/366 (2021.01 - CN EP US); B22F 2207/01 (2013.01 - EP US); F04D 29/321 (2013.01 - US); F04D 29/541 (2013.01 - US); F04D 29/563 (2013.01 - EP); F05D 2220/32 (2013.01 - US); F05D 2230/22 (2013.01 - EP US); F05D 2230/31 (2013.01 - EP US); F05D 2300/50212 (2013.01 - EP US); Y02P 10/25 (2015.11 - EP US); Y02T 50/60 (2013.01 - EP)

Cited by

EP4209681A1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)

EP 3173582 A1 20170531; **EP 3173582 B1 20220420**; BR 102016025933 A2 20170613; CA 2948252 A1 20170524; CA 2948252 C 20191210; CN 107035425 A 20170811; CN 107035425 B 20191220; JP 2017096281 A 20170601; JP 6374937 B2 20180815; US 10196898 B2 20190205; US 11225871 B2 20220118; US 2017146021 A1 20170525; US 2020024956 A1 20200123

DOCDB simple family (application)

EP 16200203 A 20161123; BR 102016025933 A 20161107; CA 2948252 A 20161114; CN 201611044328 A 20161124; JP 2016222018 A 20161115; US 201514950343 A 20151124; US 201816226703 A 20181220